

51st IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) –  
The Next Steps (A4)  
SETI 2: SETI and Society (2)

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ENGINEERING STELLAR GRAVITATIONAL LENSES FOR INTERSTELLAR COMMUNICATION  
AND ARTIFACT SETI

**Abstract**

Several recent publications have proposed a "stellar relay" transmission system in which a spacecraft near the focus of a star's gravitational lens dramatically increases the gain of an outgoing or incoming interstellar broadcast. We look at some of the engineering requirements of a stellar relay system, assess the long-term viability of a gravitational relay, and discuss the disturbances and drifts that must be constantly resisted in order to keep a relay-star-target alignment. The principal disturbances on a relay-Sun-target alignment are the Sun's inward gravity and the planets' reflex motion of the Sun. Over century-long timeframes, these  $m s^{-1} yr^{-1}$  accelerations can be countered with current propulsion systems. This investigation is also pertinent to telescope designs that want to employ the Sun as a focusing element. We also consider the prospects for an artefact SETI search to detect stellar relays placed around the Sun by an extraterrestrial intelligence, and we propose that certain nearby stars that are relatively unaffected by planetary systems serve as favourable nodes for a stellar relay communications system.